



**UNITED STATES AIR FORCE  
RESEARCH LABORATORY**

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**Compilation of Technical Papers  
Published Under Work Unit 72312501  
(71844501) "Acceleration Performance  
in Advanced Operational Systems,"  
1985-2000**

William B. Albery

**AIR FORCE RESEARCH LABORATORY**

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Human Effectiveness Directorate  
Biodynamics and Protection Division  
Biodynamics and Acceleration Branch  
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This technical report has been reviewed and is approved for publication.

FOR THE DIRECTOR

//signed//

F. WESLEY BAUMGARDNER, PhD  
Chief, Biodynamics and Protection Division  
Air Force Research Laboratory

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## 14. ABSTRACT

This report contains a listing of technical papers, reports, oral presentations, book chapters, abstracts, proceedings papers, and journal articles developed by the engineers and scientists at the Dynamic Environment Simulator centrifuge, in the Biodynamics and Acceleration Branch (AFRL/HEPA), from 1985-2000. The papers are listed by first author and chronologically under ten different categories: Sustained acceleration, human performance, biodynamics models, physiology, robotics, supermaneuverable and agile flight, adaptive controls and force reflection, situational awareness/spatial disorientation, helmet mounted systems, and miscellaneous topics.

## 15. SUBJECT TERMS

Sustained acceleration, human performance, biodynamic models, physiology, robotics, supermaneuverable and agile flight, adaptive controls and force reflection, situational awareness and spatial disorientation, and helmet mounted systems

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## PREFACE

The Biodynamics and Biocommunications Division (CFB) existed from 1985-1996 until it was reorganized under the structure of the Air Force Research Laboratory in 1997. The purpose of this report is to follow up on a previous biography for the Biodynamics and Bioengineering Division and document those paper products developed by the branches in the CFB division over the 11-year period (1985-1996). This report is a summary from the CFBS branch. The branches involved include:

- CFBA – Biological Acoustics Branch
- CFBE – Impact and Escape Branch
- CFBS – Combined Stress Branch
- CFBV – Vulnerability Assessment Branch

The author would like to thank Marty Luka and Carleen Shumway of Veridian, Inc. who helped assemble and organize the material, as well as the former CFB secretaries who gathered the information from the principal investigators. They include: Merry Spahr, CFBA; Jean Smart, CFBE; Roxanne Baer and Hetty Daugherty, CFBS; and Donna Dodd, CFBV. I should also acknowledge my predecessor, Dr. Robert Van Patten, who was the CFBS Branch Chief from 1985-1989. The author served as chief from 1989-1997 and then as team leader from 1997-2000. Chiefs of the division included: Dr. Henning von Gierke (1985-1989), Mr. Jim Brinkley (1989-1994), and Dr. Thomas Moore (1995-1998), who directed much of the research reports that are listed herein. The reports are listed in alphabetical order by author and they include the general topic area they cover, such as acceleration performance or physiology.

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## INTRODUCTION

This report provides a listing of research efforts conducted under Project/Task/Work Unit 72312501 (1985-1995) and 71844501 (1995-2000). The papers, reports, presentations, book chapters, abstracts, and journal articles are listed chronologically under research projects performed on the Dynamic Environment Simulator (DES) centrifuge. The papers and reports are listed under the following research areas:

- Sustained Acceleration
- Human Performance
- Biodynamic Models
- Robotics
- Physiology
- Supermaneuverable and Agile Flight
- Adaptive Controllers and Force Reflection
- Situational Awareness/Spatial Disorientation
- Helmet Mounted Systems
- Miscellaneous Topics

## CHRONOLOGY OF RESEARCH EFFORTS ON THE DES 1985-2000

Listed are the research protocols conducted under Work Unit 72312501 and 71844501

### 1985

- MULTI G VALVE PHASE 1
- DHE – Di-Hydroergotamine and +Gz tolerance
- ELECTRIC G VALVE
- BUTT STRAP G SUIT
- SPACE SICKNESS – Pre Adaptive Training (PAT)
- ECHOCARDIOGRAM AT HIGH G
- BANG-BANG SERVO (BBS) VALVE
- HIGON (human) – High +Gz Onset
- HF/RP VALVE – High Flow Ready Pressure Valve
- O2/CO2 – Mixed Gas Study
- ECHO INFLATION VOLUME
- BANG-BANG SERVO AND HIGH FLOW READY PRESSURE VALVES
- FAILED VALVE EVALUATION FOR LIFE SUPPORT SPO

### 1986

- ADVANCED G VALVE COMPARISONS
- SEQUENTIALLY INFLATING G SUIT
- SPACE SICKNESS/PAT

### 1987

- WORKLOAD PERFORMANCE
- SAO2 – Pulse Oximeter Evaluation
- EYE COMPRESSION UNDER G
- EYE BLINK MONITOR EVALUATION
- BELLOFRAM ANTI-G SUIT VALVE EVALUATION
- RHESUS G INDUCED LOSS OF CONSCIOUSNESS (GLOC)
- CREST – Crew Escape Technology Restraint Evaluation
- LOWER BODY NEGATIVE PRESSURE PROTECTION

1988

CERV – Crew Emergency Return Vehicle  
SPATIAL DISORIENTATION – G Excess Effect  
TRAINING FOR HOLLOMAN CENTRIFUGE PERSONNEL  
TIME ESTIMATION – Performance at High G  
CHIX IN SPACE – Shuttle Launch Effects on Chicken Eggs (NASA)

1989

TIME ESTIMATION II  
LASER DOPPLER DEVICE EVALUATION  
MASS PERCEPTION AT HIGH G  
RETROGRADE INFLATION G-SUIT (RIAGS) EVALUATION  
GLOC PHARMACOLOGY  
MORA – Mandibular Orthopedic Repositioning Appliance Effects on G Tolerance  
DYNAMIC RESPONSE TESTING

1990

MORA PHASE II  
CHOICE REACTION TIME AT HIGH G  
POSITIVE PRESSURE BREATHING SUPPORT  
I-NIGHTS NIGHT VISION GOGGLE EVALUATION  
TPAT – Tactile Perceived Attitude Transfer  
I-NIGHTS II  
FORWARD LEAN G PROTECTION (with Northrop)

1991

CHRONIC EFFECTS OF PPB & HIGH G  
CLOSED LOOP TRACKING  
AGILITY (SUPERMANEUVERABILITY)  
TPAT II  
TPAT PHASE III  
COMBAT EDGE REGULATOR TESTS

1992

ICECS – INTEGRATED CLOSED ENVIRONMENTAL CONTROL SYSTEM  
ATLANTIS WARRIOR WATER FILLED G SUIT  
SPACE MOTION SICKNESS  
BODY POSITION MEASUREMENT AT HIGH G  
G SUIT EVALUATION STUDY  
NIGHT VISION

1993

JUMPING AT G  
VISUALLY PERCEIVED EYE LEVEL (VPEL)  
HELMET MOUNTED DISPLAY EVALUATION

1994

AGILITY (SUPERMANEUVERABILITY) EVALUATION  
VPEL PHASE II  
HELMET MOUNTED DISPLAY EVALUATION  
DES CENTRIFUGE HYDROSTATIC BEARING FAILURE, MAY 94

1995

DES OPERATIONAL, SEP 95  
WOMEN IN COCKPIT STUDY INITIATED

1996

GENTEX HELMET TESTING  
BRC DES DYNAMICS – Biodynamics Research Corporation (SBIR)  
CANADIAN PUSH/PULL STUDY (DCIEM)

1997

NVS OPTICAL STABILITY STUDY  
WOMEN IN COCKPIT STUDY II  
3D AUDIO STUDY  
CLARK ATLANTA NECK STUDY - SBIR  
WALT DISNEY IMAGINEERING COOPERATIVE RESEARCH  
PUSH/PULL WITH PPB  
ATAGS FOLLOW-ON TO DWHRP – Defense Women's Health Research Program

1998

HELMET BIODYNAMICS AT HIGH G  
SAILSS – Smart Aircrew Integrated Life Support System  
COLOR PERCEPTION AT HIGH G  
STRAIN-PULL EFFECT ON G TOLERANCE  
COLOR DIGITS PERCEPTION  
COLOR PERFORMANCE TASK

1999

AGILE FLIGHT I - Effect of  $\pm G_x$  on  $+G_z$  Tolerance  
HIGH G-ONSET  
COLOR GY – Effects of  $\pm G_y$  on  $+G_z$  Tolerance and Color Perception  
COLOR PERCEPTION II  
ETC CAB IMPULSE TESTING  
IOT-Intra-ocular Pressure at High G  
COLOR SATURATION

2000

VISOR DEFLECTION ON JOINT HELMET MOUNTED CUEING SYSTEM AT HIGH G  
GLOC RECOVERY – Effect of Repeated GLOC on Recovery  
GLOC RECOVERY - G-valve tests for Brooks AFB  
GLOC RECOVERY PHASE II – Effect of Recovery at  $\leq 1$  Gz  
HELMET BIODYNAMICS – Effect of Helmet Mass, CG on Helmet Pointing Performance

The following papers are listed, chronologically, under ten different categories. At the end of each entry, the type of document is indicated (see this key).

KEY	
TR	Technical Report
A	Abstract
P	Oral Presentation
CP	Proceedings Paper
J	Journal Article
RJ	Refereed Journal Article
BC	Book Chapter
TN	Technical Note

### **SUSTAINED ACCELERATION**

**Jennings, T.** (1985 Mar) *The Effect of Anti-Ballooning G-Suit and Buttstrap on G-Tolerance*, AFAMRL-TR-85-027. (TR)

**Van Patten, R.E.** (1985 Mar) *Development of a Bang-Bang Servo Anti-G Valve for High Performance Fighter Aircraft*, DTIC No. AD-B092168, AFAMRL-TR-85-024. (TR)

**Albery, W.** (1985 Apr) *Simulation of High +Gz Onset in the Dynamic Environment Simulator*, AFAMRL-TR-85-030. DTIC No. AD-A155963. (TR)

**Van Patten, R.E.** (1985 May) *Validation of an Advanced Servo Anti-G Valve by Human Testing Under High Onset, High Sustained +Gz Acceleration*, Aerospace Medical Association Meeting, San Antonio TX. (A,P)

**Jennings, T.** (1985 May) *The Effect of Oxygen and Carbon-Dioxide on the Cardiovascular System and the Ischemic Tolerance Interval During +Gz Acceleration*, AFAMRL-TR-85-041. (TR)

**Frazier, J.** (1985 Aug) *Evaluation of an Electro-Pneumatic Anti-G Valve in a High Onset Rate Acceleration Environment*, DTIC No. AD-B095438, AAMRL-TR-85-051. (TR)

**Van Patten, R.E.** (1985 Oct) *Human Factors and Performance Issues in the Design of High Performance Fighter Aircraft Cockpits*, Proceedings of the International Conference on Aviation Physiology, Environmental Tectonics Corporation. (CP,P)

**Van Patten, R.E.** (1985 Dec) *Current Research on Advanced Concept Anti-G Suits*, Survival and Flight Equipment (SAFE) Association Annual Symposium, Las Vegas NV. (CP,P)

**Van Patten, R.E.** (1985) *Development of an Electro-Pneumatic Anti G-Valve for High Performance Fighter Aircraft*, SAFE Journal, Vol. 15, No. 4, pp 10-14. (J)

**Seaworth, J.** (1985) *Effect of +Gz Acceleration on Cardiac Volumes Determined by Two-Dimensional Echocardiography*, SAFE Journal, Vol. 15, No. 4, pp 4-9. (J,P)

**Jennings, T.** (1985 Mar) *The Effect of Anti-Ballooning G-Suit and Buttstrap on G-Tolerance*. Air Force Aerospace Medical Research Laboratory AFAMRL-TR-85-027. (TR)

**Frazier, J.W.** (1986 Apr) *A Comparative Study of Two Anti-G Suit/Valve Combinations on Human Gz Tolerance*, DTIC No. AD-B102-353, AAMRL-TR-86-017. (TR)

**Van Patten, R.E.** (1986 May) *A Methodology for the Reduction of False Alarm Rates in Artificial Intelligence-based Loss of Consciousness Monitoring Systems*, Proceedings of the National Aerospace and Electronics Conference (NAECON), Dayton OH. (CP,P)

**Van Patten, R.E.** (1986 May) *Advances in Anti-G Valve Technology: What's in the Future?* Aerospace Medical Association Science and Technology Committee Symposium on G Induced Loss of Consciousness, Nashville TN. DTIC No. AD-A198-572. (A,P)

**Van Patten, R.E.** (1986 Oct) *Effects of Sustained +Gz on Biodynamics, Physiology and Pilot Performance: A Rationale for Performance Metrics*, Proceedings of the International Congress of Aviation and Space Medicine, Belgrade, Yugoslavia. (CP,P)

**Albery, W.B.** (1986 Dec) *Human Tolerance Enhancement in High Onset Rate, High Sustained +Gz with a Pulsating Servo Anti-G Valve*, SAFE Association Annual Symposium, San Antonio TX, SAFE Journal, Spring 1987. (CP,P)

**Van Patten, R.E.** (1986 Dec) *Current Research on Artificial Intelligence-based Loss of Consciousness Monitoring System for Advanced Fighter Aircraft*, SAFE Association Annual Symposium, San Antonio TX. Also in Proceedings of the 1987 NAECON Conference, Dayton OH. (CP,P)

**Albery, W.B.** (1986) *Manual Control of a Peripheral Vision Light Bar in Sustained Acceleration Research*, Annual Conference on Manual Control, Dayton OH. AFWAL-TR-86-3093. (TR)

**Cot'e, R.** (1986) *Effect of Inspiratory Volume on Intrathoracic Pressure Generated by an L-1 Maneuver*, Aviation, Space, and Environmental Medicine, Vol. 57, No. 11, pp 1035-1038. (RJ)

**Jennings, T.** (1986) *The Effect of Various Anti-shock Trouser Inflation Sequences on Hemodynamics in Normovolemic Subjects*, Annals of Emergency Medicine, Vol. 50, No. 11, pp 526-532. (RJ)

**Jennings, T.** (1986) *The Effects of Inflation of Anti-shock Trousers on Hemodynamics in Normovolemic Subjects*, Journal of Trauma, Vol. 26, No. 6, pp 544-548. (RJ)

**Van Patten, R.E.** (1986) *G's and the Aerobic Pilot*, Sport Aerobics, Vol. 11, No. 3, pp 331-375. (J)

**Jennings, T.** (1986) *The Effect of Di-Hydroergotamine on +Gz Acceleration Tolerance*, Cardiovascular Research, Vol. 20, pp 389-392. (RJ)

**Williams, C.A.** (1986) *The Relationship Between Changes in Arterial Pressure, Esophageal Pressure and the EMG of Various Muscle Groups During the L-1 Straining Maneuver at Different Spine-to-Thigh Angles*, AAMRL-TR-87-049. (TR)

**Frazier, J.W.** (1987 Mar) *A Comparison of Tracking Performance During Gy Stress Between Test Pilots and Panel Subjects*, AAMRL-TR-87-018. (TR)

**Von Gierke, H.E.** (1987 Apr) *Fighter Design for Human Load Limits*, In: North Atlantic Treaty Organization, Advisory Group for Aerospace Research and Development (AGARD) Meeting, Madrid, Spain. AGARD Report No. 746. DTIC No. AD-B005-763. (CP,P)

**Albery, W.B.** (1987 May) *Advanced Protection Concepts for the High +Gz Onset, High Sustained +Gz Flight Environment*, Aerospace Medical Association Meeting, Las Vegas NV. (A,P)

**Frazier, J.W.** (1987 May) *Initial Centrifuge Tests of a Subject Controllable Anti-G Valve*, Aerospace Medical Association Meeting, Las Vegas NV. (A,P)

**Stepaniak, P.C.** (1987 May) *Physiologic Signs During Loss of Consciousness in +Gz Acceleration*, Aerospace Medical Association Meeting, Las Vegas NV. (A,P)

**Albery, W.B.** (1987 May) *In-Flight Recovery from G-Induced Loss of Consciousness - The Other Side of the Problem*, Proceedings of the National Aerospace and Electronics Conference (NAECON), Dayton OH. (CP,P)

**O'Brien, P.M.** (1987 Nov) *Crew Escape Technologies Initial Centrifuge Test*, Proceedings of the SAFE Symposium, Las Vegas NV. (CP,P)

**O'Brien, P.M.** (1987 Nov) *Eyeblink Monitoring as a Means of Measuring Pilot Physiological State*, Proceedings of the SAFE Symposium, Las Vegas NV. (CP,P)

**Tripp, L.** (1987 Nov) *Development of an Oxygen Mask Integrated Arterial Oxygen Saturation Monitoring System for Pilot Protection in Advanced Fighter Aircraft*, Proceedings of the SAFE Symposium, Las Vegas NV. (CP,P)

**Van Patten, R.E.** (1987 Nov) *An Alternative Approach to High-G Protection*, Proceedings of the SAFE Symposium, Las Vegas NV. (CP,P)

**Campelli, C.A.** (1987) *A Comparison of the Centrifuge and Flight Tests of New Concept Anti-G Valves*, Proceedings of the National Aerospace and Electronics Conference (NAECON), Dayton OH. (CP,P)

**Williams, C.A.** (1987 Oct) *Effect of Different Body Postures on the Pressures Generated During an L-1 Maneuver*, Aviation, Space, and Environmental Medicine, Section A, file 59, pp 920-927. (RJ)

**Frazier, J.W.** (1988 Mar) *Body Displacement Measured During Sustained +Gz, -Gz, and +/-Gy Acceleration Using a Stereoscopic Photographic System*, AAMRL-TR-88-015. (TR)

**Van Patten, R.E.** (1988 Mar) *Boundaries of a Decision Space for an Artificial Intelligence-based Pilot Loss of Consciousness Monitoring System (LOCOMS) Using Human Centrifuge and Air Combat Maneuvering Range Data*, AAMRL-TR-87-080. (TR)

**Tripp, L.** (1988 May) *Development of an Oxygen Mask Integrated G-induced Loss of Consciousness Monitoring System*, Proceedings of the National Aerospace and Electronics Conference (NAECON), Dayton, OH. (A,P)

**Frazier, J.W.** (1988 May) *Anti-G Suit Pressure - How Much is Just Right?* National Aerospace and Electronics Conference (NAECON), Dayton OH. (CP,P)

**Tripp, L.** (1988 May) *Development of a Reliable, Non-Intrusive G-Induced Loss of Consciousness Monitoring Device*, Aerospace Medical Association Meeting, New Orleans LA. (A,P)

**Van Patten, R.E.** (1988 May) *Flight Test of a Rate Sensitive Anti-G Environment*, Aerospace Medical Association Meeting, New Orleans LA. (A,P)

**Van Patten, R.E.** (1988 May) *Research and Development History: Aircrew Monitoring and Pilot Loss of Consciousness Monitoring*, Automatic Flight Path Recovery Panel Meeting, Aerospace Medical Association Meeting, New Orleans LA. (A,P)

**Van Patten, R.E.** (1988 May) *A Methodology for the Reduction of False Alarm Rates in Artificial Intelligence-Based Loss of Consciousness Monitoring Systems*, Aerospace Medical Association Meeting, New Orleans LA. (A,P)

**Mawhinney, D.** (1988 May) *Flight Helmet Instrumented with Multiple Arterial Pulse Sensors*, Proceedings of the National Aerospace and Electronics Conference (NAECON), Dayton OH. (CP,P)

**Cooper, J.R.** (1988 May) *The Use of Positron Emission Tomography (PET) and Magnetic Resonance Imaging (MRI) in the Measurement of Cerebral Structural, Vascular and Metabolic Changes Following G-induced Loss of Consciousness in the Rhesus Monkey*, Proceedings of the National Aerospace and Electronics Conference (NAECON), Dayton, OH. (CP,P)

**Tripp, L.D.** (1988 Nov) *The Effects of Various Amounts of Lower Body Negative Pressure on the Physiological Effects Induced by -Gz Acceleration*, Proceedings of the SAFE Symposium, Las Vegas NV. (CP,P)

**Tripp, L.** (1988 Dec) *The Effect of Various Amounts of Lower Body Negative Pressure on the Physiological Effects Induced by Head-Down Tilt*, Proceedings of the SAFE Symposium, Las Vegas NV. (CP,P)

**Van Patten, R.E.** (1988 Dec) *Anti-G Suit Inflation Rates: An Historical Overview*, Proceedings of the SAFE Symposium, Las Vegas NV. (CP,P)

**Van Patten, R.E.** (1988 Dec) *Human Centrifuge Onset Rates*, Proceedings of the SAFE Symposium, Las Vegas NV. (CP,P)

**Chiou, W.** (1988) *A Stress Test to Evaluate the Physical Capacity of Performing L-1 Anti-G Straining Maneuvers*, AAMRL-TR-88-047. (TR)

**Beck, B.** (1989 April) *The Use of Lower Body Negative Pressure as a Counter Measure to Negative Gz Acceleration*, AAMRL-TR-89-025. (TR)

**Tripp, L.D.** (1989 May) *The Use of Lower Body Negative Pressure as a Means of -Gz Protection*, Aerospace Medical Association Meeting, Washington DC. (A,P)

**Cooper, J.** (1989 May) *The Use of Positron Emission Tomography (PET) in the Measurement of Cerebral Vascular & Metabolic Changes Following G-induced Loss of Consciousness in the Rhesus Monkey*, Aerospace Medical Association Meeting, New Orleans LA. (A,P)

**Frazier, J.W.** (1989 May) *Centrifuge Testing of Restraint Harnesses for the Crew Escape Technologies Program*, Aerospace Medical Association Meeting. (A,P)

**Tripp, L.D.** (1989 May) *The Use of Lower Body Negative Pressure as a Means of -Gz Protection*, Proceedings of the National Aerospace and Electronics Conference (NAECON), Dayton OH. (CP,P)

**Tripp, L.D.** (1989 May) *The Effect of an Anti-Ballooning Anti-G Suit and Buttstrap G-Suit on G Tolerance*, Proceedings of the National Aerospace Electronics Conference (NAECON), Dayton OH. (CP,P)

**Albery, W.** (1989 May) *Positron Emission Tomography (PET) in the Study of G-induced Loss of Consciousness (G-LOC)*, Proceedings of the National Aerospace and Electronics Conference (NAECON), Dayton OH. (CP,P)

**Chelette, T.L.** (1989 May) *Pilot Acceleration Training in the Egyptian Air Force*, Proceedings of the National Aerospace and Electronics Conference (NAECON), Dayton OH. (CP,P)

**O'Brien, P.M.** (1989 May) *Crew Escape Technologies Initial Centrifuge Tests*, Proceedings of the National Aerospace and Electronics Conference (NAECON), Dayton OH. (CP,P)

**Albery, W.B.** (1989 May) *Cerebrovascular Effects of G-induced Loss of Consciousness in Primates*, Proceedings of the National Aerospace and Electronics Conference (NAECON), Dayton OH. (CP,P)

- Tripp, L.D.** (1989 Oct) *The Use of Biomedical Instrumentation in Human Centrifuge Experimentation*, IEEE-Dayton Chapter, Dayton OH. (A,P)
- Jennings, T.** (1989 Nov) *The Effect of Various Straining Maneuvers on Cardiac Volumes at +1 Gz*, Proceedings of the SAFE Association Symposium, New Orleans LA. (CP,P)
- Skowronski, V.D.** (1989 Nov) *A Motion Activated Articulating Seat (MAAS): A Dynamic Concept for Cockpit Seat Design in High Performance Aircraft*, Proceedings of the SAFE Symposium, New Orleans LA. (CP,P)
- Tripp, L.D.** (1989 Nov) *The Effects of Various Amounts of Lower Body Negative Pressure on the Physiological Effects Induced by Head-Down Tilt*, Proceedings of the SAFE Symposium, Las Vegas NV. (CP,P)
- Williams, C.A.** (1989 Apr) *The Effects of Combined L-1 Maneuvers and Fatiguing Isometric Contractions on Acceleration Tolerance*, Aviation, Space, and Environmental Medicine, Vol. 59, No. 6, pp 656-660. (RJ)
- Tripp, L.D.** (1989) *The Effect of Various Straining Maneuvers on Cardiac Volumes at 1 G and During +Gz Acceleration*, AAMRL-TR-89-011. (TR)
- Albery, W.** (1990 Apr) *Current Status of an Artificial Intelligence Based Loss of Consciousness Monitoring System for Advanced Fighter Aircraft*, AGARD Aerospace Medical Panel Symposium, Tours, France, DTIC No. AD-A231148. (CP,P)
- Chelette, T.L.** (1990 May) *Masseter EMG as a Measure of Bite Block Use Under Various Gz Levels*, Proceedings of the National Aerospace and Electronics Conference (NAECON), Dayton OH. (CP,P)
- Albery, W.** (1990 May) *Development of a Gravity-Induced Loss of Consciousness (GLOC) Monitoring System*, Proceedings of the National Aerospace and Electronics Conference (NAECON), Dayton OH. (CP,P)
- Albery, W.** (1990 May) *Simulating High G in the Dynamic Environment Simulator*, Aerospace Medical Association Meeting, New Orleans LA. (A,P)
- Chelette, T.** (1990 May) *Effects on G Tolerance While Biting Down on a Mandibular Orthopedic Repositioning Appliance (MORA)*, Aerospace Medical Association Meeting, New Orleans LA. (A,P)
- Beck, B.G.** (1990 May) *Use of Echocardiography to Evaluate the Effects of Lower Body Negative Pressure as a Countermeasure to Negative Gz*, Aerospace Medical Association Meeting, New Orleans LA. (A,P)
- Tripp, L.D.** (1990 May) *Cerebral Blood Flow During +Gz Acceleration as Measured by Transcranial Doppler*, Meeting of the American College of Clinical Pharmacology, Houston TX. (CP,P)
- Van Patten, R.E.** (1990 May) *Current Human Factors in the Cockpit*, International Conference Sponsored by the Aeromedical and Training Institute Division of the Environmental Tectonics Corporation. (CP,P)
- Chelette, T.** (1990 Oct) *Effects on G Tolerance While Biting Down on a Mandibular Orthopedic Repositioning Appliance (MORA)*, AAMRL-TR-90-087. (TR)
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